WIND/DIESEL POWER FEASIBILITY STUDY

MUD RIVER, ONTARIO

86-05631/

WIND/DIESEL POWER FEASIBILITY STUDY

MUD RIVER, ONTARIO

Prepared for:

Doug Townsend and Fellow Residents of Mud River

Prepared by:

Doug Townsend

With a contribution from:

Remote Community Demonstration Program
of Energy, Mines and Resources Canada

March 1985

RCDP/PDCE-61

This report was prepared under the Remote Community Demonstration Program of Energy, Mines and Resources Canada (EMR). Distribution of this report by EMR does not necessarily signify that the contents reflect the views and policies of EMR. Mention of trade names and commercial products does not constitute recommendation or endorsement for use.

CONTENTS

		Page
EXECUTIVE SUMMARY		iv
RÉSUMÉ		v
1.0	INTRODUCTION	1
	1.1 Background	1
	1.2 Objectives and Scope	1
	1.3 Structure of the Report	1
2.0	COMMUNITY POWER REQUIREMENTS	3
3.0	COMMUNITY POWER PLANNING	6
	3.1 Assessment of Technical Options	6
	3.2 Proposed Community Power System	7
4.0	WIND TESTING STAGE	8
	4.1 Wind Testing Arrangements	8
	4.2 Wind Monitoring Unit	8
	4.3 Planned Erection of the Wind Monitoring Unit	8
	4.4 Location of the Wind Monitoring Unit	10
5.0	SUMMARY OF EVENTS	12
6.0	CONCLUSIONS AND RECOMMENDATIONS	13
	6.1 Conclusions	13
	6.2 Recommendations	14
	6.3 Current Wind Test Stage	14

Executive Summary

This study was undertaken by Doug Townsend and fellow residents of Mud River, Ontario to determine the feasibility of using wind power, supplemented by diesel fuel, to create electricity for the community.

Mud River is in the Thunder Bay District, just north of Lake Nipigon on the Pikitigushi River, 28 miles east of Armstrong. It is predominantly a native community with a population of 27. Since the community has no electricity, it depends on candles and kerosene for light. Heating and cooking needs are met by burning wood.

Winds at the nearby community of Armstrong, Ontario have been measured by Environment Canada at an average speed of 11.9 km/hr. Average winds of about 12 km/hr. are generally considered the minimum for a wind-based electrical energy system. Since winds at Mud River seemed to him to be stronger than those at Armstrong, Doug Townsend believed that a wind energy system might be feasible at Mud River.

A series of problems arose following the September 1983 commencement of the study. These difficulties prevented the installation of the wind measurement equipment, and thus wind readings, during the time of the study agreement. As a result, it is not possible to determine the feasibility of a hybrid wind/diesel energy system at Mud River.

The anticipated power requirements of the community were evaluated, however, and are described in the study. Current power requirements in Mud River are minimal. The community uses kerosene lamps for lighting and wood for space heating. Other than two small privately-owned generators, the community has no electricity. With the availability of community power, households would use several appliances: refrigerators, fluorescent lights, televisions and/or stereos, washing machines and assorted power tools. The study showed that, if electricity were available, the estimated monthly power requirement per household would be 65 kWh; the estimated monthly community power demand would be 647 kWh.

Wind measurement equipment was loaned to the community by the National Research Council of Canada (NRC). Unfortunately, prior to the March 31, 1985 completion of the study, NRC's wind program was cancelled and the recording equipment had to be returned. Determined to monitor the wind at Mud River, the community purchased a wind monitoring device from a firm in Vermont. Due to delays in delivery of the unit, the community was unable to take wind readings before the completion date of the study. The community intends to carry out wind testing and data analysis, however, and has offered to provide interested parties with its findings.

This study was undertaken with a financial contribution from the Remote Community Demonstration Program of Energy, Mines and Resources Canada (EMR).

ÉTUDE DE FAISABILITÉ SUR L'UTILISATION D'UN SYSTÈME DIESEL-ÉOLIENNE POUR LA PRODUCTION D'ÉLECTRICITÉ À MUD RIVER (ONTARIO)

Résumé

Cette étude a été entreprise par M. Doug Townsend de Mud River dans le but de déterminer les possibilités d'utiliser l'énergie éolienne pour produire de l'électricité pour cette collectivité.

Mud River est situé dans la région de Thunder Bay, au nord du lac Nipigon sur la rivière Pikitigushi, à 28 milles à l'est d'Armstrong. Il s'agit d'une collectivité formée en majeur partie d'autochtones ayant une population de 27 personnes. Puisque la collectivité n'a pas l'électricité, la population a donc recours aux chandelles et aux lampes au kérosène pour s'éclairer, et utilisent le bois pour se chauffer et cuire ses aliments.

Environnement Canada a établi que la vitesse moyenne des vents à Armstrong (une localité située près de Mud River) était de 11,9 km/h. Des vents moyens d'environ 12 km/h constituent généralement un minimum pour l'installation d'un système d'énergie électrique alimenté par le vent. Selon M. Townsend, les vents seraient plus forts à Mud River qu'à Armstrong; il serait donc possible selon lui, d'installer une éolienne à Mud River.

De nombreuses difficultés n'ont pas permis de faire des relevés du vent lors de l'étude. Il est donc malheureusement impossible de déterminer la faisabilité des systèmes hybrides diesel-éolienne pour Mud River.

Les demandes électriques anticipées par la collectivité ont été évaluées, cependant, et décrites dans le rapport. Actuellement, la demande d'électricité à Mud River est minimale. Elle n'a pas d'électricité, autre que celle produite par deux petits générateurs privés. Si un système communautaire était installé, les apareils électriques suivants seraient utilisés: frigidaires, ampoules fluorescentes, télévisions et/ou radios, machines à laver et outils électriques. L'étude démontre que si l'électricité était disponible, l'estimation mensuel de demande par demeure serait de 65 kWh et par la collectivité de 647 kWh.

Avant que l'étude soit complétée à la fin de mars 1985, le Programme d'énergie éolienne du Conseil national de recherches Canada fut annulé et les appareils enregistreurs de vents ont dus être retournés. Néanmoins, la collectivité étant déterminé de vérifier les vents, acheta un appareil d'une compagnie située au Vermont. A cause d'un délai de livraison, la collectivité n'a pu obtenir des donnés avant la date d'achèvement de l'étude. Celle-ci, cependant, a l'intention d'exécuter des essais, d'analyser les donnés et de fournir ses constatations à Energie, Mines et Ressources Canada et autres groupes intéressés.

Cette étude a bénéficié d'une subvention dans le cadre du Programme de démonstration dans les collectivités éloignées d'Energie, Mines et Ressources Canada.

1.0 INTRODUCTION

This is the final report of a study undertaken by Doug Townsend and fellow residents of Mud River to determine the feasibility of using wind power, supplemented by diesel fuel, to create electricity for the community. The study was made possible by a financial contribution from the Remote Community Demonstration Program of Energy, Mines and Resources Canada.

1.1 Background

Mud River is in the Thunder Bay District, just north of Lake Nipigon on the Pikitigushi River, 28 miles east of Armstrong (see Figure 1). It is a predominantly native community with a population of 27. Since the community has no electricity, it depends on candles and kerosene for light. Heating and cooking needs are met by burning wood.

Winds at the nearby community of Armstrong, Ontario have been measured by Environment Canada at 11.9 km/hr.[1] Average winds of about 12 km/hr. are generally considered the minimum for a wind-based electrical energy system. Since winds at Mud River seem to him to be stronger than those at Armstrong, Doug Townsend believed that a wind energy system might be feasible at Mud River.

1.2 Objectives and scope

The objective of this study was to assess the technical feasibility and relative economics of a wind/diesel electrical generating system for Mud River. The study was intended to be undertaken in four stages:
Stage 1: Installation of Wind Measuring Equipment
Stage 2: Recording of Data
Stage 3: Determination of Community Power Requirements
Stage 4: Preparation of Cost Estimates

A series of problems, described below, prevented the erection of the monitoring unit and thus the recording of data. As a result, the study did not determine the feasibility of a wind energy system at Mud River. The community's power requirements, however, were evaluated, and are described here.

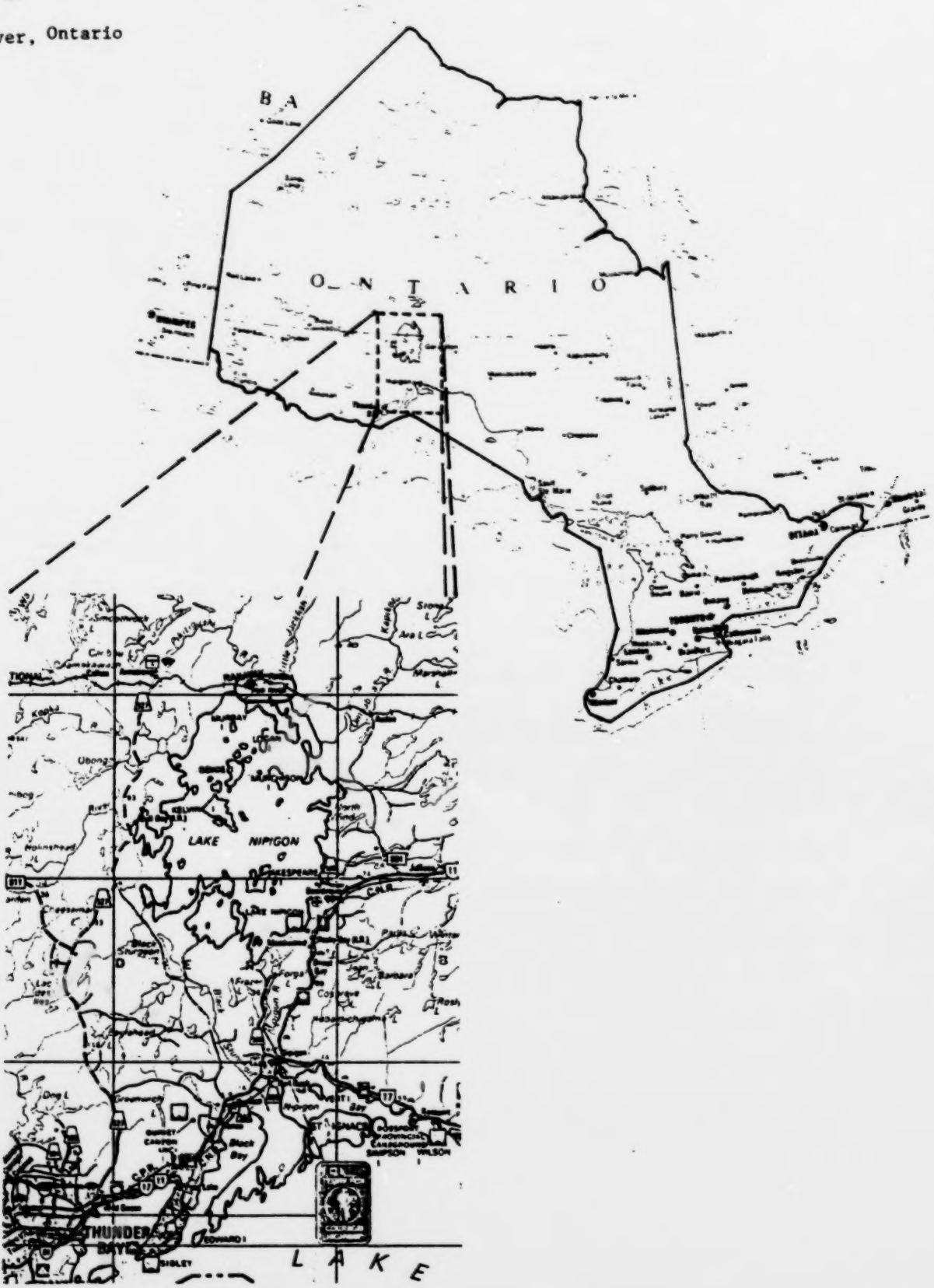
1.3 Structure of the report

This report is presented in 5 sections. Section 2 presents information on Mud River's power requirements. Section 3 presents an overview of power options considered by the community. Section 4 describes how the wind testing was intended to be carried out. Section 5 summarizes events during the project. Section 6 consists of conclusions and general recommendations.

1 Canadian Climate Normals. Vol. 5, Wind, 1951-1980, Environment Canada, Atmospheric Environment Service, Ottawa 1982, p. 65.

Figure 1:

Mud River, Ontario



2.0 COMMUNITY POWER REQUIREMENTS

An evaluation of community power requirements was undertaken. This section describes the exercise and presents the results of the analysis.

The study to determine the power requirements of each household was undertaken in order that the proposed wind turbine could be properly sized to Mud River's electricity demand.

The first step consisted of a community meeting to explain the options open to Mud River and the objectives of the study. Initial reaction was positive among the younger residents. Several older residents, though, were not easily convinced that a power system of this nature would benefit the community. In time, however, all but two residents agreed that participation in this venture was necessary in order to make inroads to a better standard of living.

The next step consisted of meeting with each interested family to describe its role in the study. They were asked to prepare a list of lamps, appliances and other equipment that they would eventually wish to use. Typically, the lists included a refrigerator, fluorescent lights, television and/or stereo, washing machine and assorted power tools. About half the households interviewed included a personal water pump. Each household estimated the number of hours per month that the appliance would be operating to obtain the monthly power requirements. A chart listing anticipated monthly power requirements and a diagram indicating the position of appliances were prepared for each household. Examples are given in Table 1 and Figure 2.

In arriving at an estimate of total anticipated community power demand, several assumptions were made in this study:

- the monthly load was based on a 31-day month;
- the lighting loads were based on the worst possible case (December 21);
- the refrigerator used for the survey was an energy-conserving AC/DC model operating directly from a solar evacuated tube array;
- resistive loads (toasters, heaters) were either minimized or left out completely;
- other appliances would have the flexibility of drawing DC or AC power.

The analysis also took into consideration any additional houses to be built soon in the community and power losses associated with battery inefficiencies, transformers, line losses and inverters (if necessary). Table 2 lists a summary of the data generated by the survey (see page 5).

TABLE 1

MUD RIVER COMMUNITY CO-OP ELECTRIC POWER SYSTEM
SUBJECT: ITEMIZED MONTHLY HOUSEHOLD POWER REQUIREMENTS

HEAD OF HOUSEHOLD: John Nodin WHITESAND BAND

John Nodin	59		
"Spot" (Dog)			

MONTHLY POWER ESTIMATES:

LAMP OR APPLIANCE	WATTS	HRS/DAY	HRS/WK	HRS/MNTH	KWH/MNTH
FLUO LAMP	15	4		124	1.860
FLUO LAMP	20	4		124	2.480
FLUO LAMP	20	2		62	1.240
YARD LIGHT	150	1		31	4.650
REFRIGERATOR-FREEZER	72	12		372	26.784
WASHING MACHINE	400			2	.800
SEWING MACHINE	-				
WATER PUMP	400			9	3.600
AM RADIO CASSETTE PLAY	24	2		62	1.488
TELEVISION	50	5		155	7.750
POWER TOOLS	480			3	1.440
MISC					2.000
TOTAL					54.092
EXTRA LOAD ALLOWANCE	10%				5.409
GRAND TOTAL					59.501

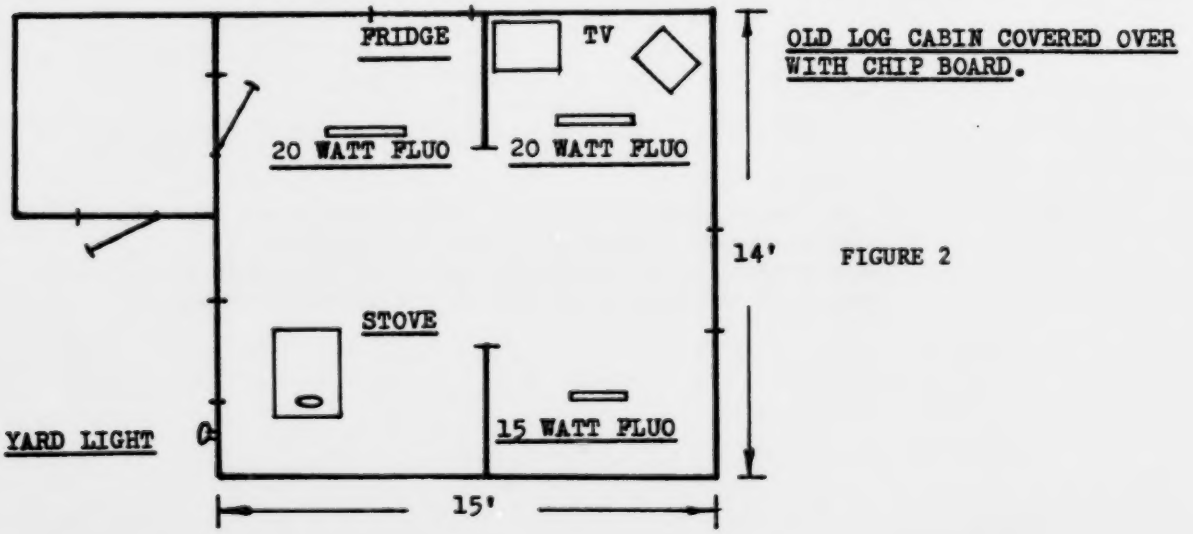


FIGURE 2

TABLE 2 - SUMMARY OF ITEMIZED POTENTIAL MONTHLY HOUSEHOLD POWER REQUIREMENTS

Household	Band	House Number	kWh/Month
John Nodin	Whitesand Band	255	59.501
Howard Nodin	Whitesand Band	395	79.883
Francis Nodin	Whitesand Band	330	73.405
Richard Wanakamik	Whitesand Band	368	58.765
Leslie Shapwaykeesic	Fort Hope	847	65.326
Johnson Shapwaykeesic	Fort Hope	505	56.115
Ambrose Lachinette	Whitesand Band		52.564
Charlie Shapwaykeesic	Fort Hope	506	80.823
Francis Donio	Whitesand Band	423	67.293
Bill Potvin	(Retired CN Operator)		53.145
TOTAL ESTIMATED COMMUNITY POWER REQUIREMENTS/MONTH			646.820

It was estimated that the community power requirements would not exceed 1000 kWh/month even if every home participated in the co-operative wind turbine venture. As pointed out by Doug Townsend, Mud River's power requirements are meagre in comparison to urban dwellers'. Nevertheless, "even this modest amount of electrical power would have a considerable impact on the people's standard of living."

3.0 COMMUNITY POWER PLANNING

This section describes the community's evaluation of feasible power options and the system selected, a hybrid wind/diesel energy system.

3.1 Assessment of Technical Options

The decision to investigate the wind/diesel hybrid electrical generation system was prompted by the community's investigation of the various available power generation options:

- Ontario Hydro grid connection
- micro-hydro
- wood/peat gasification
- photovoltaic cells
- diesel generator
- wind turbine (wind energy conversion system)

It was found that Mud River, with ten permanent homes, does not qualify for hook-up to the Ontario Hydro grid because Ontario Hydro requires that eligible communities have a minimum of twenty-five permanent homes. Although it is thought that there are adequate hydraulic resources to support a micro-hydro plant near Mud River, the option was rejected due to the community's distance from the rapids and the high cost of building the system and distribution lines. Wood gasification appeared to have potential because of the extensive local wood supply. This was found to be uneconomic, however, because of the high initial capital costs of a wood gasification unit. Peat gasification was also eliminated from further consideration due to high capital costs. An examination of the local peat resources also indicated that the peat is of poor fuel quality. A photovoltaic system was not regarded as viable because the power demand is greatest during the months with the least amount of usable solar radiation (November and December). A stand-alone diesel generator was rejected because of the high and uncertain costs of fuel and mechanical service. Most of the time, the diesel would be poorly loaded, resulting in a higher cost per kWh and a shorter diesel lifetime.

The analysis concluded that a wind/diesel hybrid system with battery storage would be able to meet the community's power requirements. Mud River residents also felt that a renewable energy system is more in keeping with their lifestyle and surrounding environment.

Relative energy self-sufficiency, a significant improvement in standard of living, low noise and pollution, the creation of a few jobs, skills upgrading, and low servicing and maintenance requirements were considered potential benefits of a wind/diesel hybrid system.

3.2 Proposed Community Power System

The community decided that a 10 kW wind turbine would meet its power demand (see Section 2.0: Community Power Requirements). Residents narrowed their choice to either a Jacobs or an Aerowatt horizontal wind turbine. This would be coupled to a 120-volt direct current (DC) battery storage bank and a backup diesel generator. The two small, privately-owned diesel generators existing at Mud River are not considered to be sufficient as backup and they would be displaced by a new diesel generator.

The wind turbine would provide power when the windspeed is sufficient. The battery bank, in addition to storing excess electrical energy, would act as a backup source of power in times of low windspeeds. The diesel generator backup would provide power and/or charge the battery during periods of insufficient wind, servicing or breakdown. By loading the diesel to near-capacity when in operation, the lifetime and frequency of service would be extended significantly.

An effort is being made to achieve a totally DC electrical system in the community. This would reduce power losses and eliminate costly inverters, transformers and other AC conversion equipment. Research has revealed that a 120-V DC refrigerator that consumes considerably less power than conventional models is available. The community is still searching for a 120-V DC washing machine.

An interesting aspect of the Mud River wind/diesel proposal is the community's intention is to set up a co-operative, which would operate like a utility. Once the cost per kWh and depreciation of equipment had been calculated, watt-meters would be installed in each house. Residents would pay a monthly bill to the utility for power consumed.

The residents of Mud River intend to construct and erect the entire system themselves. This would provide jobs, experience and knowledge. Their aim is to be able to assist other native communities in building their own power generation systems. At present, a young graduate wind engineer who has had experience at the California wind farms has expressed his willingness to visit Mud River and train the construction crew. The Jacobs Company, a manufacturer of wind turbines, has offered to provide one week's training at its factory in Minneapolis for the Mud River workers at no cost. (Mud River would have to cover travel expenses.) The community is exploring other sources of support for training and related expenses.

4.0 WIND TESTING STAGE

This section describes the roles of various participants in the wind testing stage, the wind monitoring equipment, the community's plans for erecting the unit and location of the equipment in the community.

4.1 Wind Testing Arrangements

In the fall of 1983, Doug Townsend made arrangements to secure a wind-monitoring device. The National Research Council of Canada agreed to loan Mud River a wind histogram recorder (WHR) for up to two years. TES Limited in Ottawa, under contract to NRC, would undertake data analysis of the readings.

The data sheets would be used to record the data from the WHR and then would be sent to TES Limited for analysis. During the first month of monitoring, data sheets would be sent in once a week in order to determine if the histogram was working properly. Data sheets would be sent in once a month thereafter.

Doug Townsend would provide a tower for mounting the WHR, a suitable location for the controls and data collection equipment, and oversee the wind monitoring tests.

4.2 Wind Monitoring Unit

The wind testing equipment assembled for use in the study consisted of the following:

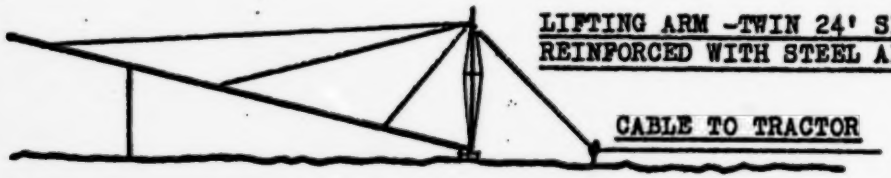
- wind histogram recorder
- histogram controls and data collection device
- 88-foot tower
- cables and guy rods

4.3 Planned Erection of the Wind Monitoring Unit

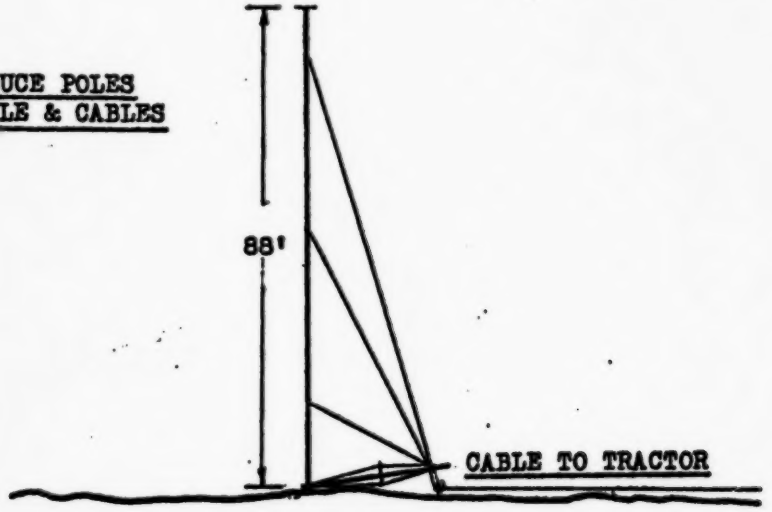
At the outset of the study, the community identified an appropriate foundation and devised a method of installing the tower.

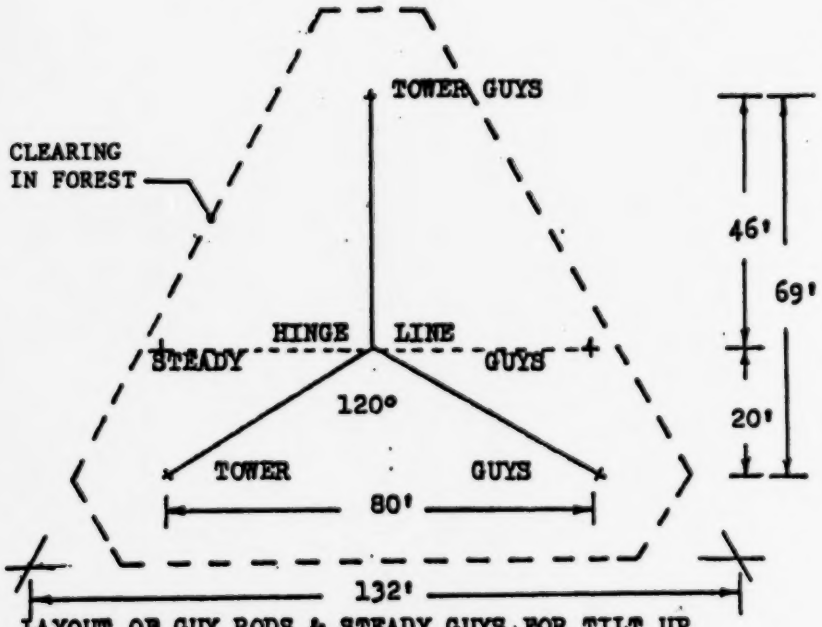
The tower would be installed on a concrete base. A foundation would be dug using a large post-hole digger and filled with concrete. Guy rods, necessary to secure the tower, would then be installed. This would involve the removal of 18 to 24 inches of surface muskeg (which lacks holding power) in order to reach clay, and the insertion of the guy rods approximately 8 feet into the clay. Holes would be backfilled with clay, which would serve as replacement for the muskeg. To raise the tower, two 30-foot spruce poles would be cut in the bush and used as lifting poles. A tractor would be used to raise the tower. (See Figures 3 and 4.)

As described below (Section 5.0: Summary of Events), the community had to install a different foundation type and adapt the methods of installing the tower due to unforeseen difficulties.

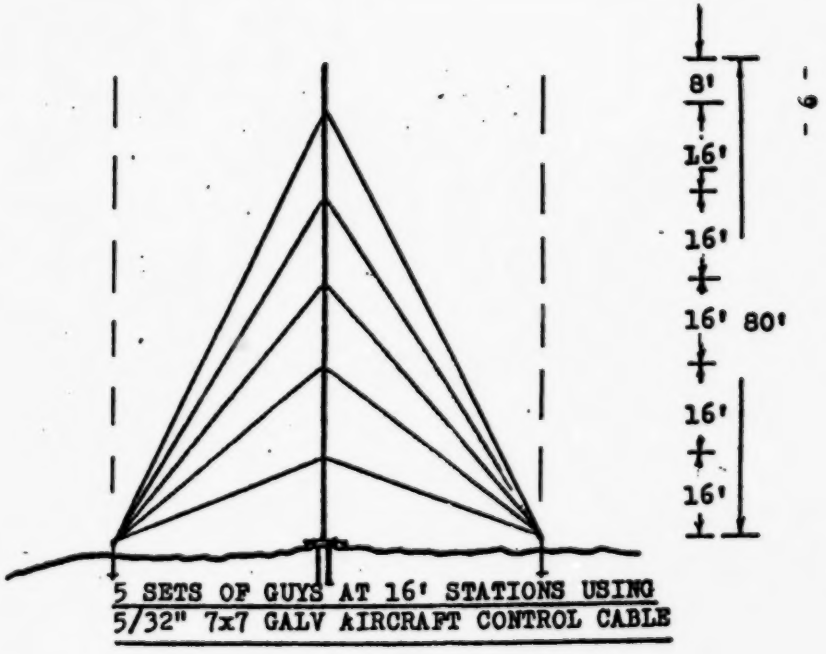


TILT UP ERECTION BY MEANS OF HINGED BASE & LIFTING ARM





LAYOUT OF GUY RODS & STEADY GUYS FOR TILT UP
LARGE TREES SUBJECT TO BLOW DOWN, MUST BE RE-
MOVED FROM THE AREA OUTSIDE OF THE CLEARING.



5 SETS OF GUYS AT 16' STATIONS USING
5/32" 7x7 GALV AIRCRAFT CONTROL CABLE

FIGURE 3: INSTALLATION AND MOUNTING OF THE WIND TESTING UNIT

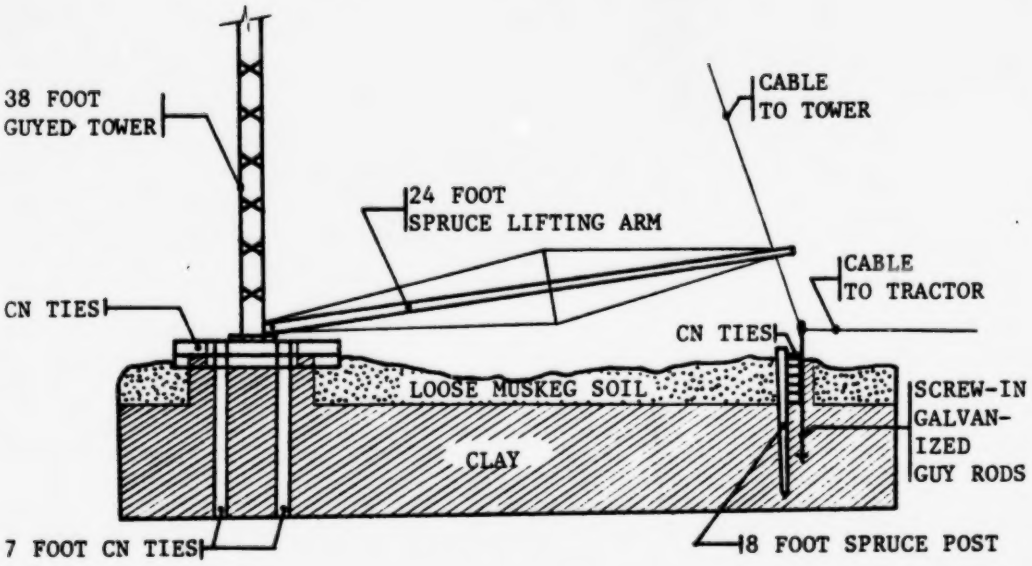


FIGURE 4: DETAIL OF TOWER FOUNDATION AND GUY RODS

4.4 Location of the Wind Monitoring Unit

Figure 5 shows the location of the tower in the community and several considerations leading to the selection of this location. As indicated, the community took safety and climatic factors into account in locating the wind monitoring unit.

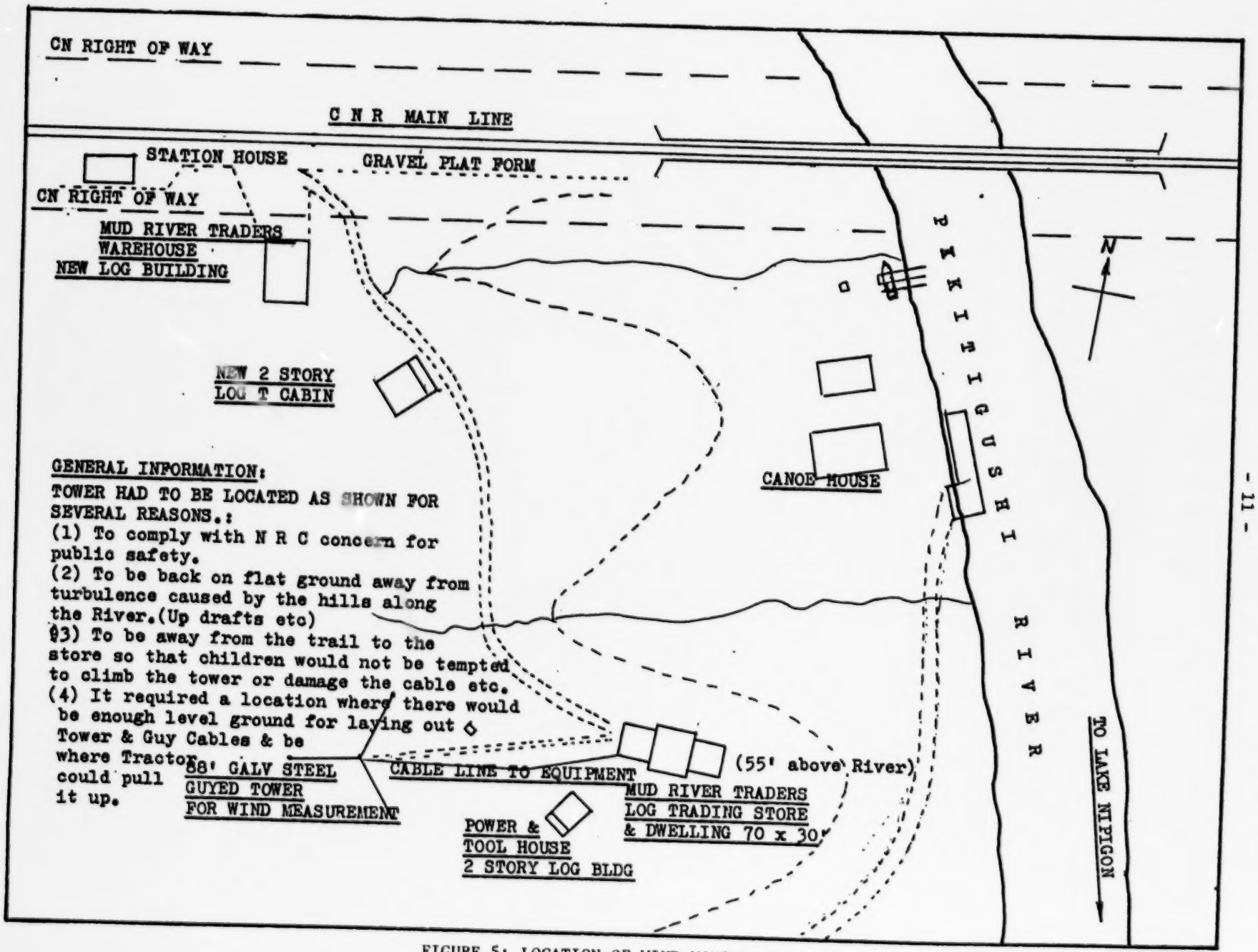

CN RIGHT OF WAY
C N R MAIN LINE
STATION HOUSE
GRAVEL PLAT FORM
CN RIGHT OF WAY
MUD RIVER TRADERS
WAREHOUSE
NEW LOG BUILDING
NEW 2 STORY
LOG T CABIN
GENERAL INFORMATION:
TOWER HAD TO BE LOCATED AS SHOWN FOR SEVERAL REASONS.:
(1) To comply with N R C concern for public safety.
(2) To be back on flat ground away from turbulence caused by the hills along the River.(Up drafts etc)
(3) To be away from the trail to the store so that children would not be tempted to climb the tower or damage the cable etc.
(4) It required a location where there would be enough level ground for laying out Tower & Guy Cables & be where Tractor could pull it up.
88' GALV STEEL
GUYED TOWER
FOR WIND MEASUREMENT
CABLE LINE TO EQUIPMENT
POWER &
TOOL HOUSE
2 STORY LOG BLDG
MUD RIVER TRADERS
LOG TRADING STORE
& DWELLING 70 x 30'
(55' above River)
CANOE HOUSE
N
P E K I S I G U S H I
R I V E R
TO LAKE NIPIGON

FIGURE 5: LOCATION OF WIND MONITORING UNIT

5.0 SUMMARY OF EVENTS

This section presents the series of events which occurred, ultimately preventing the erection of the monitoring unit and consequently the recording of data. It highlights the community's innovative solutions to install the wind testing equipment.

The Mud River community began the project following the September 1983 government approval of the study.

First, the community cleared land for the histogram tower. The tower was transported, unassembled, from Ottawa to Mud River by train. Community residents transported the tower from the Mud River train station to the site, where the tower was bolted into sections. The histogram arrived along with the tower.

Community members cut two 30-foot spruce poles in the bush and took them to the site to act as lifting poles for the tower.

Two problems then arose: the high water table made digging the tower foundation impossible, and NRC realized that the histogram should not have been loaned to Mud River without proper insurance coverage. By spring 1984, the insurance was arranged.

The existence of the high water table meant that the use of a cement foundation for the tower platform would be impossible. In place of the concrete foundation, the community devised a base using railway ties donated by Canadian National Railways (CN). Four eight-foot railway ties, treated with two coats of gum, were sunk vertically seven feet into clay. This depth would ensure that the ties would be below the frost level. Additional clay was brought to the site to build up the ground around the foundation by an additional 20 inches. Four railway ties were then laid around the vertical ties and fastened by heavy-steel straps. The steel straps were also donated by CN: heavy steel angle scraps from a CN bridge had been declared surplus. CN also aided the project by cutting and drilling the large scraps to size in its Hornepayne Shop.

Once the base was installed, the community worked on the problem of installing the guy rods. Surface muskeg 18 to 24 inches deep had to be removed to reach clay. Guy rods were inserted eight feet into the clay. Holes were backfilled with clay, which served as a replacement for the muskeg. Members of the community had to carry in several tons of clay since getting a tractor in to do the job would have necessitated building a road. Despite the cold weather and the fact that everyone was covered with frozen clay by the end of the day, Doug Townsend says, "There was not a word of complaint about the cold, the heavy digging, or the tubs of heavy clay".

Meanwhile, there was a problem with the insurance. While the community had paid its premium in August 1984, the documentation had yet to arrive. Once the insurance papers appeared in the fall, Doug Townsend signed a loan agreement with NRC and a contribution agreement with EMR. The contribution agreement called for wind monitoring to be completed by March 31, 1985, the closing date of Phase I of the Remote Community Demonstration Program.

In November 1984, the community was ready to raise the tower when it was discovered that the spruce lifting arms might not support the full length of the tower. They were reinforced with steel. Figure 4 shows how the community intended to raise the tower.

Nature then intervened with a freak ice storm that left the entire 88 feet of tower heavily covered with ice. Since there is no chance of a thaw in December, the tower had to be dismantled into six sections, the supporting cables removed, and the whole thing carried into the Mud River Outfitters and Traders store for the ice to melt.

Doug Townsend says, "We had customers crawling under the sections to reach the counter and the Indian children climbing all over them; chunks of ice and water were all over the floor. We did not want to try knocking the ice off for fear of putting dents in the light-gauge walls which might lead to buckling. We did not want to scratch the galvanized surface for fear of rust setting in."

It was decided to resume work in the new year, but 1985 ushered in another problem: cancellation of NRC's wind program. This meant that the wind recording equipment loaned by NRC had to be returned.

There was little time left to order a wind monitoring unit from another supplier and resume the study. The community was determined to continue the project, however, "decided to go a little deeper into debt", as Doug Townsend says, and purchased a Wind Hawk 8000 monitoring device from NRG Systems in Bristol, Vermont. Unfortunately, arrangements to get delivery of the equipment were complicated due to the distance which the device had to travel and the necessity of getting Canada Customs clearance before it could reach its destination. As of the end of March 1985, the community of Mud River was reassembling the tower and guy cables; at the same time, while there was still a good crust of the snow in the bush, the community was trying to get its wood supply for the next winter.

6.0 CONCLUSIONS AND RECOMMENDATIONS

As circumstances prevented the erection of the wind monitoring unit and consequently the collection of wind speed data, this study does not determine the feasibility of a hybrid wind/diesel energy system. Conclusions and recommendations based upon the work carried out have been made, however, and are presented below.

6.1 Conclusions

The following conclusions were drawn respecting the community's power supply and requirements:

- Among the power supply options considered possible for Mud River, micro-hydro, wood/peat gasification, photovoltaics and a stand-alone diesel were deemed uneconomical, and Mud River is ineligible for connection to the Ontario Hydro grid.

- A wind/diesel system was considered economically feasible and offers direct and indirect benefits such as: increased energy self-sufficiency, improved standard of living, job creation and skills-upgrading potential, low noise and pollution, low maintenance and servicing requirements.

- The majority of Mud River residents support the proposed wind/diesel supply.

- The existing power requirements in Mud River are minimal (candles and kerosene lamps are used for lighting and wood is used for heating).

- The availability of community power would allow households to install refrigerators, washing machines, water pumps, fluorescent lights and use power tools.

- The potential monthly power requirement per household is 65 kWh; the potential monthly community power demand is 647 kWh.

6.2 Recommendations

The community of Mud River is interested in a wind/diesel energy system to supply community power. Wind speeds at Mud River are also believed by the community to be higher than those at the nearby community of Armstrong (12 km/hr. on average at Armstrong - the minimum considered necessary for such a system). This study therefore recommends that government agencies responsible for or involved in community energy supply and northern affairs monitor the wind speed testing project underway at Mud River and evaluate the data generated by this project. Should wind speeds prove higher than the basic minimum required, it is recommended that the community thoroughly investigate the comparative economics of this and other energy supply options and that government agencies consider supporting a demonstration of a wind/diesel system, if the economics prove attractive.

6.3 Current Wind Test Stage

For information on this study and results of the wind testing project underway at Mud River, interested persons may contact Doug Townsend at the following address:

Mud River Traders and Outfitters
Mud River, via Armstrong P.O.
Ontario P0T 1A0